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## **FOUNDATION STRUCTURE**

## **INTRODUCTION AND BACKGROUND TO THE INVENTION**

This invention relates to a composite foundation structure and a method of  
5 constructing such structure.

In certain problem soil conditions, such as sandy, cobbly, clayey, gravelly soil or the like, conventional so-called waffle raft foundations are relatively difficult to construct. The reason for this is that when digging a grid of intersecting trenches in such problem soil, the sidewalls of the trenches tend to collapse.

## **OBJECT OF THE INVENTION**

It is accordingly an object of the present invention to provide a composite foundation structure and a method of constructing such structure with which the  
15 aforesaid disadvantage can be overcome or at least minimised.

## SUMMARY OF THE INVENTION

According to a first aspect of the invention there is provided a method of constructing a composite foundation structure including the steps of:

- 20 - providing a plurality of panels;

- arranging the panels to provide shuttering defining a grid of intersecting channels for receiving settable material;

- casting settable material into the channels; and

- allowing the settable material to set and to bond to the shuttering so that  
the panels are incorporated into the foundation structure as an integral part thereof.
- 5 The method may include the further step of providing a level surface on which the shuttering is constructed by either levelling the existing soil surface or by removing soil, for example.
- The shuttering may be arranged such that they form angular structures defining
- 10 10 an internal opening, the grid of channels being defined between adjacent structures.
- Adjacent structures may be connected to and spaced from each other with spacers.
- 15 The method may include the further step of returning removed soil to the internal openings after the step of arranging the panels and prior to casting the settable material into the channels.
- 20 20 The method may include the further step of compacting the soil in the openings.

The panels may comprise non-degradable pre-cast concrete or fibre reinforced cementicious material.

The spacers may also be of cementicious material.

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According to a second aspect of the invention there is provided a composite foundation structure constructed according to the above method.

According to a third aspect of the invention there is provided a foundation structure comprising:

- a grid of intersecting beams of set settable material; and
- shuttering of pre-cast panels bonded to the settable material.

The shuttering may be of settable material.

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Preferably the panels are of non-degradable pre-cast concrete or fibre reinforced cementicious material.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

20 The invention will now be described further by way of example only with reference to the accompanying drawings wherein:

- figure 1 is a cross-sectional plan view along line B - B<sup>1</sup> in figure 2 of a composite foundation structure according to a first embodiment of the invention;
- figure 2 is a cross-sectional end view along lines A - A<sup>1</sup> in figure 1;
- 5 figure 3 is a cross-sectional end view similar to that of figure 2 of a composite foundation structure according to a second embodiment of the invention; and
- figure 4 is a cross-sectional plan view similar to that of figure 1 of a composite foundation structure according to a third embodiment
- 10 of the invention.

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**DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION**

Referring to figures 1 and 2, a composite foundation structure according to a first embodiment of the invention is generally designated by reference numeral  
15 10.

The foundation structure 10 comprises shuttering 12 of pre-cast panels 14, defining an intersecting grid of channels 16 wherein beams 18 of settable material are cast.

20 The pre-cast panels 14 are of a fibre-reinforced concrete and are preferably in the form of reject panels of the type used in mining applications, for example. The applicant has found that reject panels are preferable due to their relatively

rough surface. The pre-cast panels 14 are nailed to each other to form rectangular structures 14.1 each defining a central opening 14.2.

In use, the ground surface 22 (figure 2) is levelled by removing a body of soil  
5 and the rectangular structures 14.1 arranged on the ground 22, with the panels 14 in parallel extending spaced relationship, and with adjacent rectangular structures 14.1 being connected to and spaced from each other by spacers 20 of the same material. An intersecting grid of channels 16 is thus defined between the rectangular structures 14.1.

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The soil that was removed to level the ground 22 is disposed in the internal openings 14.2 and compacted. Thereafter a settable material in the form of concrete is cast into the channels 16 and across the rectangular structures 14.1 to cover the compacted soil, and allowed to set. The concrete bonds to the pre-  
15 cast panels 14 and spacers 20 to form an integral composite foundation structure 10 that can be constructed relatively easily in problem soils.

The method according to the invention provides the further advantage of using waste material that is relatively cheap.

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Referring to figure 3, a composite foundation structure according to a second embodiment of the invention is generally designated by reference numeral 10A. The foundation structure 10A is similar to the foundation structure 10, with the

exception that the pre-cast panels 14A are arranged to provide a channel 16A having an inverted T-shaped cross-sectional or hammer foot profile. Such foundation structure 10A is relatively stiffer but more expensive due to the use of more concrete in the construction thereof. It will be appreciated that the 5 foundation structure 10A according to the second embodiment of the invention is particularly suitable for soil that is very problematic.

Referring to figure 4, a composite foundation structure according to a third embodiment of the invention is generally designated by reference numeral 10B. 10 The foundation structure 10B is similar to the foundation structure 10, with the exception that the pre-cast panels 14B are arranged to provide a triangular internal opening 14.2B.

It will be appreciated that variations in detail are possible with a composite 15 foundation structure and a method of constructing such structure according to the invention without departing from the scope of the appended claims.